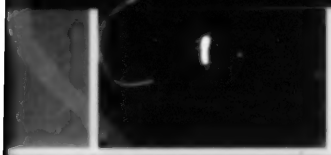

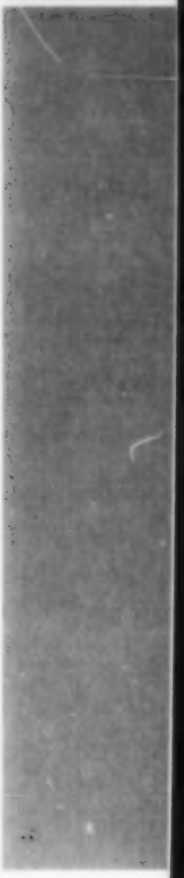

Safe Handling and Use of Agricultural Chemicals and Biological Materials

SAFE FARMS
SPOT THE HAZARD
ASSESS THE RISK
FIND A SAFER WAY
EVERYDAY

Manitoba

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Safe Handling and Use of Agricultural Chemicals and Biological Materials

This booklet is not intended to replace detailed training for people who handle agricultural chemicals or biological materials. All farm owners and employers are responsible for ensuring that anyone on their farms who are handling hazardous materials are properly trained to do so.

The risk of using any substance is the product of: the hazard of the substance multiplied by the length of time and the quantity you are exposed to.

RISK = HAZARD (toxicity) X EXPOSURE (how much and how long)

The first step in protecting yourself and others is to know what you are working with – both organic and synthetic chemicals can be hazardous to human health.

Hazardous materials that can be found on farms

Biological materials – This is a broad term that includes substances such as animal wastes and byproducts (that may contain bacteria and viruses), to diseased animals such as insects, birds, reptiles, etc. (that may be infected with a virus or bacteria), to plant materials such as poison ivy.

Cleaners and sanitizers – These are commonly found in horticultural, dairy, beef and pork operations, where both food safety and animal/human well-being must be ensured.

Desiccants – These substances are used to stop plant growth before harvest. They're also used in small quantities to remove moisture from compressed air lines in work shops.

Fertilizers – These can be organic or chemical materials that provide nutrients and trace elements to plants/crops to enhance yield. Available as a compressed gas (anhydrous ammonia), liquid, dry granule, dry manure (dry matter) and liquid manure (slurry).

Fuels – These include common substances such as gasoline, diesel fuel, kerosene and biofuels.

Growth Regulators – These substances are used to stop stalk growth before heading loss.

Pesticides – These substances (manufactured and naturally occurring) are used to control unwanted organisms. They include herbicides for plants, insecticides for insects, fungicides for fungi and rodenticides for rodents.

Veterinary Supplies – These come in a variety of forms and are used for the treatment of animal health and growth.

These substances can be found in various forms throughout a farm operation, including: dust/aerosols, fumes, mist, liquids, granules, gases, vapours and smoke.

Understanding Labels

Labels give important information that will help protect whoever is handling or exposed to the substance from harm. ALWAYS READ THE LABEL.

There are different labeling requirements for different substances.

- **Pesticides** (organic and chemical) are regulated by the *Pest Control Products Act* administered by the federal Pest Management Regulatory Agency (PMRA)
- **Hazardous products** include compressed gases, flammable and combustible materials, oxidizing agents, poisonous materials; other toxic effects, biohazardous infectious, corrosive and dangerously reactive, all require a Workplace Hazardous Materials Information System (WHMIS) label when the product is used in a workplace.

Products sold as consumer products intended for *use in the home* are labeled according to Consumer Chemicals and Containers Regulations.

Pesticides

Typical pesticide label

1. Read the entire label, not just the application-rate information.
2. Understand what the hazard symbols mean.
3. Use the safety equipment required to do the job.
4. Ask your supplier for the material safety data sheet (MSDS). These have additional safety information. Keep MSDS for your records management system.
5. Always have an emergency wash station near any area where you are mixing and applying any chemicals. Have at least 20 litres of clean water, soap and a clean towel available.

Current pesticide label information can be found at pr-rp.pmra-arla.gc.ca/portal/page?_pageid=34,17551&_dad=portal&_schema=PORTAL.

Pesticide Label Information	
Label element	**Description**
Trade or Product Name	The name may include a distinctive brand or trademark which will usually be prominently displayed.
Classification	All pest control products are classified for intended use and by toxicity into one of four pesticide classes (domestic, commercial, manufacturing or restricted). The class is based on where the product will most often be used and how hazardous the product is to the user and the environment. It is also an indication of the care that should be taken when using, storing and transporting the pesticide.
Pesticide Type	This is a description of the intended purpose of the product. Some of the most commonly used pesticides include herbicides, insecticides and fungicides.
Active Ingredient(s) and Guarantee of Concentration	Each active ingredient is identified by its established common name and the concentration in the formulation (% by weight or by volume).
Type of Formulation	Is a description of the physical form of the product such as dust, liquid, wettable powder, etc.
Pest Control Product Registration Number	For example REGISTRATION NO. 00000 PEST CONTROL PRODUCTS ACT.
Registrant's Name and Address	Name and address, and sometimes a telephone number. Under some circumstances, the name and address of the Canadian Agent may be required instead. The registrant or agent can always be contacted for additional information.
Net Contents of Package	The amount of pesticide product in the container expressed in metric units. This information will help you decide how many packages will be needed.
Directions for Use	Includes species that are intended targets of the product, dosage rates, timing of application and limitations for use of the product. May list the re-entry time.
Degree and Nature of Hazards	Indicated by precautionary signs, symbols and signal words (see Table 2) as standardized and outlined in the Pest Control Products Regulations.
Precautionary Statements and Handling Precautions	Presents information on hazards relating to handling, storage, display, distribution and disposal. Instructions on how to eliminate the hazards should also be outlined here. May list the re-entry time.
First Aid Instructions	Gives practical information on what to do in the event of poisoning or injury by the product.
Toxicological Information	Gives information essential to treatment if a person is injured, or poisoned by the product. Includes the symptoms of poisoning, antidote or remedial measures and identity of other ingredients (such as petroleum distillates) in the product that may effect treatment. May list the re-entry time.

Workplace Hazardous Material Information System

For hazardous materials that are not covered by the *Pest Control Products Act*, the *Fertilizers Act*, the *Veterinary Medicine Act* or that are considered consumer products, the Workplace Hazardous Material Information System (WHMIS) applies with the following labeling requirements.

A **supplier label** which looks like this sample must appear on all controlled products received at workplaces in Canada and must contain the following information:

- product identifier (name of product)
- supplier identifier (name of company that sold it)
- a statement that a material safety data sheet (MSDS) is available
- hazard symbols or pictures of the classification
- risk phrases (words that describe the main hazards of the product)
- precautionary measures (how to work with the product safely)
- first aid measures (what to do in an emergency)
- all text in English and French
- the WHMIS border is cross-hatched

Exceptions

Supplier labels for materials from a laboratory supply house may contain less information than this. However, the materials must be intended for use in a laboratory in an amount less than 10 kilograms. Controlled products that are sold in a container with less than 100 millilitres may contain less information.

If the product is always used in the original container with the supplier label and the label is placed securely and clear on the container, no other label is required. However, if you put some of the material into another container for use in the workplace the new container must have a workplace WHMIS label.

A **workplace label**:

- must appear on all controlled products produced in a workplace or are transferred to other containers by the employer
- may appear in placard form on controlled products received in bulk from a supplier
- should have the following information:
    - product identifier (product name)
    - information for the safe handling of the product
    - statement that the MSDS is available
    - may contain the WHMIS hazard symbols or other pictograms.

These are the minimum requirements for workplace labels. Employers may wish to put more information on the labels, but it is not required under the law.

The Workplace Hazardous Materials Information System symbols and their classifications:

	CLASS A: COMPRESSED GAS This class includes compressed gases, dissolved gases, and gases liquefied by compression or refrigeration.
	CLASS B: FLAMMABLE AND COMBUSTIBLE MATERIAL This class includes solids, liquids, and gases capable of catching fire in the presence of a spark or open flame under normal working conditions.
	CLASS C: OXIDIZING MATERIAL These materials increase the risk of fire if they come in contact with flammable or combustible materials.
	CLASS D: POISONOUS AND INFECTIOUS MATERIAL Division 1: Materials Causing Immediate and Serious Toxic Effects These materials can cause death or immediate injury when a person is exposed to small amounts. Examples: sodium cyanide, hydrogen sulphide
	CLASS D: POISONOUS AND INFECTIOUS MATERIAL Division 2: Materials Causing Other Toxic EFFECTS These materials can cause life-threatening and serious long-term health problems as well as less severe but immediate reactions in a person who is repeatedly exposed to small amounts.
	CLASS D: POISONOUS AND INFECTIOUS MATERIAL Division 3: Biohazardous Infectious MATERIAL These materials contain harmful micro-organisms that have been classified into Risk Groups 2, 3, and 4 as determined by the World Health Organization (WHO) or the Medical Research Council of Canada.
	CLASS E: CORROSIVE MATERIAL This class includes caustic and acid materials that can destroy the skin or eat through metals. Examples: sodium hydroxide, hydrochloric acid, nitric acid
	CLASS F: DANGEROUSLY REACTIVE MATERIAL These products may self-react dangerously (for example, they may explode) upon standing or when exposed to physical shock or to increased pressure or temperature, or they emit toxic gases when exposed to water.

Consumer Products

Consumer products are hazardous products typically sold by retailers and intended for use in the home rather than for industrial applications. They require a different labeling and warning system.

The labels of any consumer products that contain hazardous products will have a picture inside a frame indicating the type of danger.

Consumer Product Symbols	
	EXPLOSIVE The container can explode if heated or punctured. Flying pieces of metal or plastic from the container can cause serious injury, especially to eyes.
	CORROSIVE The product can burn your skin or eyes. If swallowed, it will damage your throat and stomach.
	FLAMMABLE The product or its fumes will catch fire easily if it is near heat, flames or sparks. Rags used with this product may begin to burn on their own.
	POISON If you swallow, lick, or in some cases, breathe in the chemical, you could become very sick or die.
	OCTAGONAL FRAME This frame means that the **contents** inside the container are dangerous.
	TRIANGLE FRAME This frame means that the container itself is dangerous.

One of the following cautionary words will appear below the frame to provide additional warnings:

CAUTION This means there's a frequent possibility of injury. Death may occur with extreme exposure.

DANGER This means contents may cause temporary or permanent injury or death.

EXTREME DANGER This means exposure to very low quantities may cause death or temporary or permanent injury.

The back side or side labels on regulated containers will always have some type of border. Inside the border, you will find safety instructions, the words **FIRST AID TREATMENT** and instructions in case of injury, and a list of harmful substances in the product.

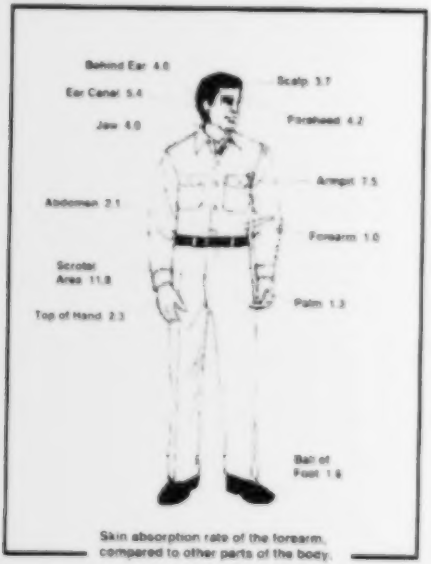
How Harmful Substances Enter The Body

There are four basic ways harmful substances can enter the body. Depending on the composition of the chemical it may enter the body very quickly via one route and slowly via another. Some chemicals may also enter the body by multiple routes. By understanding the chemical MSDS, you will be able to easily determine what type of protection is required for each chemical.

Absorption

Skin is porous to certain chemicals (not water) and they can soak into the skin and work their way into the underlying tissue and then into the bloodstream. Eyes, ear canals and moist areas of the body (mucous membrane, groin, arm pits, etc.) are highly absorptive to these kinds of chemicals, as are cracked skin or open wounds.

It's important to wash hands thoroughly before using the washroom, touching food or utensils or handling anything that goes into the mouth.



Skin absorption rate of the forearm, compared to other parts of the body.

Inhalation

Breathing through the mouth and nose can draw in air-borne chemicals and then transfer them into the bloodstream. Dust, powders, mists and fumes are the most likely things to be inhaled.

Ingestion

Although people don't intentionally eat poisonous chemicals, they can still ingest them unintentionally. Handling or eating food with utensils or dishes; or licking our lips before washing well, can transfer harmful chemicals into the digestive system.

Injection

Chemicals can be injected into the body when an object that is contaminated with a chemical pierces the skin. The most obvious danger is veterinary needles. However nails, wire or staples can also break the skin and inject a chemical into the body. Fine streams of fluids, under high pressure, can also be forced through the skin.

Selection, Use and Maintenance of Personal Protective Equipment

Personal protective equipment (PPE) is only effective if it is appropriate for the hazard and used and maintained as instructed by the manufacturer. There are several key questions to consider when selecting PPE.

- What is the personal protective equipment that is recommended on the product label?
- Are there any medical conditions that might be aggravated by wearing PPE, such as respirators? (Discuss this with a family physician.)
- What, specifically, are you trying to protect yourself from? (Ex: Gloves for handling chemicals are not universally applicable; some may be affected by solvents used in the chemical formulation.)
- If conditions change in your work area, is your PPE adequate for those changes? For example, if you are preparing feed and are wearing a disposable particulate mask and then proceed to work in the barn where ammonia levels are irritating, the particulate mask will not provide you with any protection from the ammonia. Always plan ahead and ensure that your personal protective equipment is providing you with adequate protection.
- Does the PPE fit you properly? One-size does not fit all. Wrong-size equipment is uncomfortable, does not provide proper seals and protection and may expose you to other hazards such as snagging or restricted vision.

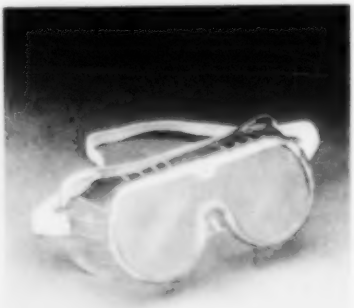
The selection of the specific equipment has to be based on an informed risk assessment of the type of work being performed and the potential of exposure to the hazards associated with that work. Because PPE comes in a variety of sizes and configurations, each piece of equipment must be fitted to the user. The user must also be educated in the use, limitations and maintenance of the equipment.

Head Protection

Because the head has a particularly high absorption rate through the skin, it is important to wear some form of head covering that will not absorb liquids, mists or dust particles.

Eye/Face Protection

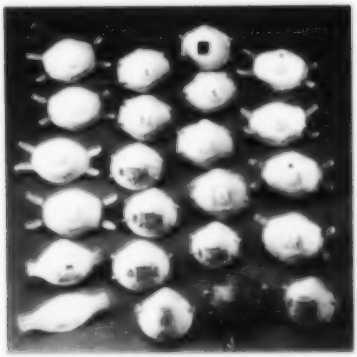
Depending on the type of work being done, the options are a full-face mask or goggles that seal around the eyes. Regular safety glasses do not adequately protect the eyes from side splashes, dust, leaks down into the eyes or irritating gases or fumes.



Respiratory Protection

There are several protection options for dust, mist, vapours or fumes. Special air-supplied respirators are required for work in conditions where there are high concentrations of hazardous gases (ex: hydrogen sulfide) or for an oxygen-deficient environment.

Disposable masks are usually particulate masks that are generally intended for capturing small, solid, airborne particles and some fumes and vapours. They cannot be cleaned or disinfected and must be discard after use.



Half-face chemical cartridge respirators are moulded respirators that cover the mouth and nose forming an airtight seal around the face. These respirators have one or two replaceable cartridge elements. There are a variety of cartridges available to prevent specific chemicals from entering the breathing zone. It is important to buy the appropriate cartridge for the chemicals being handled. This respirator **will not** offer any protection in an oxygen-deficient environment.

Full-face chemical cartridge respirators are very similar to the half-face respirators. However they have a full-face shield that protects the entire face (including eyes) from exposure. The mask forms a seal around the entire face.

To check the fit of a chemical cartridge respirator, do two tests after putting on the respirator according to the manufacturer's instructions:

1. The positive pressure test involves blocking the exhalation valve with the palm of the hand and then gently exhaling. If the mask is properly fitted, the face piece will bulge slightly.
2. The negative pressure test involves placing the palm over the respirator's cartridge openings, then gently inhaling. The face piece should collapse slightly.

If either of these tests fail and an air leak is detected, reposition the respirator on the face and retest.

- Facial hair (even a five-o'clock shadow) will interfere with the respirator seal. It can allow contaminated air to pass between the skin and the respirator, rather than being filtered through the cartridge.
- Specialized respirators such as supplied-air and powered, air-purifying respirators are available for situations where half or full-face chemical cartridge respirators are not adequate. When buying a respirator, ask your supplier to train you to use it properly.
- See the chart at the end of this booklet to make a more informed decision on selection of appropriate respiratory protection equipment.

Hand Protection

Special gloves are needed for handling different chemicals. Buy gloves:

- that are resistant to the particular chemical you will be handling
- that are not lined, to avoid the chance of the lining absorbing any chemical and keeping it in contact with the skin
- with a long gauntlet so a cuff can be rolled at the end to act as a trap, to avoid chemicals from running down the glove under the sleeve

Body Protection

Because of the body's large skin area and its ability to absorb chemicals rapidly, it is important to have appropriate protective clothing.

- **Chemical-resistant aprons**, should extend from just below the neck down to cover to the tops of protective boots. The apron will not protect arms from exposure.
- **Chemical-resistant coveralls**, should have elastic cuffs and a hood. These will help create a barrier at the wrists and ankles. The legs of the coveralls should go over the top of protective rubber boots not inside.

Foot Protection

Impervious protective footwear should be worn when handling chemicals. Runners or leather shoes will absorb chemical splashes and spills which increases the exposure of the foot to the chemical.

Maintaining Personal Protection Equipment

Personal protective equipment must be well-maintained. Damaged or poorly maintained equipment will not effectively protect you.

Follow the manufacturer's instructions to maintain equipment. When it's worn or damaged, replace it.

Personal Hygiene

Always wash hands and face with soap and water before eating, smoking or touching anything that may go in the mouth. Chemicals can be transferred easily from hands to food and then be ingested.

Since the skin in the groin area is more than 10 times more porous than the forearm, wash your hands **before** using the bathroom.

Laundering Work Clothes

- Read all chemical labels for information on cleaning/laundering.
- Handle chemically soiled clothing with chemical-resistant gloves.
- When possible, remove pesticide/chemical granules or residue from cuffs and pockets outdoors.
- Discard any clothes contaminated with full-strength chemical and use the manufacturer's directions to do it.
- Use disposable, plastic garbage bags for temporary storage of chemical soiled clothes before washing.
- Wash contaminated clothing separately from family clothing.
- Use hot water (60°C).
- Do not overload the washer. Do one or two items at a time, using 1 ½ times more heavy duty detergent.
- Wash contaminated clothes a second time.
- Dry clothing on clothes line to avoid contaminating the dryer.
- Run the empty washer through a full wash cycle with detergent to clean it before washing family clothing.

Health Effects of Chemical Exposure

The effects of chemical exposure can be acute (short-term) and/or chronic (long-term). It is important to recognize the symptoms of acute exposure to chemicals. Immediate treatment can mean the difference between mild and serious illness. Ensure that a worker who has been exposed to a dangerous chemical is taken to a doctor immediately.

Some of the general symptoms of chemical exposure may be mistaken for the flu and include:

- headache, fatigue, nausea and stomach cramps
- thirst, nervousness, diarrhea and moodiness
- loss of appetite or weight, dizziness and weakness
- constricted pupils, blurred vision and irritated eyes, skin, nose and throat

The full impact of poisoning may not occur right away. In cases of skin absorption it can take from to 12 to 24 hours. Symptoms of severe poisoning are often specific and require immediate hospital treatment. The problem of long-term, low-level exposure leading to chronic illness is the delay of symptoms.

Severe symptoms of chemical poisoning may include (but are not limited to):

- difficulty breathing
- fever and loss of reflexes
- muscle twitching, convulsions and unconsciousness

Cholinesterase Testing for Pesticide Applicators

Cholinesterase is an enzyme in the body that is essential for the central nervous system to function properly. Some pesticides (particularly insecticides) can interfere with the body's production of cholinesterase. Medical attention is needed if the body doesn't produce enough.

If using cholinesterase-inhibiting pesticides more than one or two days a month, discuss cholinesterase testing with your doctor. You can establish a baseline cholinesterase level before you begin to handle any pesticides.

Chemical Storage

- Never store agricultural chemicals in the house.
- Always store chemicals in original containers. If you must transfer chemicals to other containers, transfer the chemical name and the safety information from the original label to the new container.
- Store agricultural chemicals and treated seed in locked, well-marked areas.
- Store chemicals well away from human and animal feed.
- Choose an area at least 50 metres from wells and 70 metres from surface water.
- If flooring is absorbent, lay down a water-resistant tarp or a sheet of plastic to prevent chemicals from soaking into the flooring.
- Never store chemicals in beverage containers.
- Personal protective equipment should not be stored in a chemical storage area.

Emergency Preparedness

Be prepared for an emergency before it occurs.

- Develop and post a list of emergency telephone numbers, including:
  - Manitoba's Poison Control Centre – 1-204-787-2591
  - local ambulance and fire service (it may not be 911)
  - local doctor's number and nearest hospital emergency room
  - Manitoba Conservation – 1-204-944-4888
- Keep directions on how to find your farm posted near the phone.
  - Keep a first aid kit and have all family and employees trained on how to administer it.
  - Have emergency personal protective equipment on hand.
  - Keep absorptive material (cat litter or dry clay) for chemical spills.
  - Keep a container and tools for collecting and containing contaminated materials.

Agricultural Exposure Respirator Selection Chart

Activity	Exposure	Air Purifying Respirators: Filtering face piece	Air Purifying Respirators: Half mask face piece	Supplied air respirators: Full face piece	Supplied air respirators: Powered air-purifying	Supplied air respirators: Airline	Supplied air respirators: SCBA	Notes
Livestock & Poultry CAFO (Confined Animal Feeding Operation)	Organic Dust	✓ N, R, or P series	✓ N or P series	✓ N or P series	✓ HEPA filter			
	Ammonia		✓ Ammonia cartridge	✓ Ammonia cartridge				Add N or P prefilter if protection for dust is desired
	Disinfectants	✓ Solids N, R or P series	✓ Solids N, R or P series Liquids (add P prefilter to cartridges for spray applications) - Hypochlorite (bleach) or iodine solutions: AG cartridge - Quaternary ammonium compounds: ammonia cartridge - Oxidizing (peroxide) agents: N or P filter - Aldehyde compounds: cartridge with specific label for formaldehyde & OV - Phenol compounds: OV cartridge	✓ Solids N, R or P series Liquids (add P prefilter to cartridges for spray applications) - Hypochlorite (bleach) or iodine solutions: AG cartridge - Quaternary ammonium compounds: ammonia cartridge - Oxidizing (peroxide) agents: N or P filter - Aldehyde compounds: cartridge with specific label for formaldehyde & OV - Phenol compounds: OV cartridge				Read label or MSDS for proper selection based on formulation & active ingredients. Spraying liquid formulations create aerosols; use N or P prefilter with chemical cartridge
	Carbon monoxide					✓	✓	May be a contaminant from poorly vented space heaters
	Hydrogen sulfide					✓	✓	Released from manure pit during pit agitation or pumping. Restrict entry, ventilate area
	Methane					✓	✓	Explosion hazard. Prevent sparks, vent

Legend

Particulate filters & prefilters

Designation according to oil degradation resistance

N = not for use in presence of oil mist

R = some resistance to oil mist

P = for use where oil mist present ("oil proof")

Chemical cartridges

OV = organic vapours

AG = acid gas

Designation according to filter efficiency

95 = moderate filtering efficiency (95 %)

99 = high filtering efficiency (99 %)

100 = highest filtering efficiency (99.97 %), comparable to HEPA (high efficiency particulate air) filter

N95: can not be used in presence of oil mist, has 95 % filter efficiency. P100: can be used if oil mist present, 99.97 % filter efficiency

These Agricultural Exposure Respirator Selection Charts were adapted with permission from the AgriSafe Network, Spencer, Iowa.

Agricultural Exposure Respirator Selection Chart

Activity	Exposure	Air Purifying Respirators		Supplied air respirators				Notes
		Filtering face piece	Half mask face piece	Full face piece	Powered air-purifying	Airline	SCBA	
Pesticide use (herbicides, insecticides)	Aerosols (solids and spray liquids) Organic Vapours (sprayed liquids)	✓ Solids N, R or P series	✓ Solids N or P series Liquids Organic vapour cartridge & P prefilter	✓ Solids N or P series Liquids Organic vapour cartridge & P prefilter	✓ Solids HEPA filter Liquids Organic vapour cartridge & P prefilter			
Grain handling: Silo or bin unloading	Organic dust (feed or grain dust, molds, spores)	✓ N series	✓ N or P Series	✓ N or P series	✓ HEPA filter			
Anhydrous ammonia field application	Anhydrous ammonia field application	Ammonia	✓ Ammonia cartridge	✓ Ammonia cartridge				Protect skin and eyes in using half face piece
Welding	Metal fumes (Particulates)	✓ N100, R 100 or P100	✓ N 100, R100 or P 100 filter	✓ HEPA filter			✓	Ventilate area to control carbon monoxide exposure Use UV and face protection
Using gas or diesel engine indoors (power-washing, skid loader, etc.)	Carbon monoxide		No air purifying respirator effective: ventilate area or use supplied air or SCBA				✓	Ventilate area to control carbon monoxide exposure Using gas or diesel engines indoors can create an environment that is considered an oxygen deficient atmosphere

Legend

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Agricultural Exposure Respirator Selection Chart

Activity	Exposure	Air Purifying Respirators: Filtering face piece	Air Purifying Respirators: Half mask face piece	Supplied air respirators: Full face piece	Supplied air respirators: Powered air-purifying	Supplied air respirators: Airline	Supplied air respirators: SCBA	Notes
Fumigation	Toxic gases Potential oxygen deficiency in enclosed area		✓ (only for outdoors use) OV cartridge & P prefilter	✓ Solids N or P series Liquids Organic vapour cartridge & P prefilter	✓ Solids HEPA filter Liquids Organic vapour cartridge & P prefilter	✓ For enclosed areas	✓ For enclosed areas	Read label or MSDS Supplied air respirators required for soil or space fumigants in enclosed areas
Silo entry Non-air-tight silo Oxygen limiting	Oxides of nitrogen Potential oxygen deficiency						✓	Do not enter for at least 10 – 14 days after filling, without running blowers for a least 30 minutes, monitoring nitrogen oxide levels to assure nontoxic levels and wearing SCBA if elevated levels.
Paint (spraying)	Aerosols Organic vapours	✓ N, R or P series	✓ OV cartridge & P prefilter	✓ OV cartridge & P prefilter		**	**	** Isocyanate paints require supplied air respirators
Woodworking, remodeling	Aerosols (wood, sheetrock dusts)	✓ N, R or P series	✓ N or P filter	✓ N or P filter	✓ HEPA filter			
	Organic vapours (lacquers, thinners, varnish, adhesives)		✓ OV cartridge					

Legend

Particulate filters & prefilters

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99 = high filtering efficiency (99 %)

100 = highest filtering efficiency (99.97 %), comparable to HEPA (high efficiency particulate air) filter

N95: can not be used in presence of oil mist, has 95 % filter efficiency. P100: can be used if oil mist present, 99.97 % filter efficiency

These Agricultural Exposure Respirator Selection Charts were adapted with permission from the AgriSafe Network, Spencer, Iowa.

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